

### **REMARKS**

Attached hereto is an Excess Claims Fee letter for excess independent claims.

It is noted that the claim amendments herein are intended solely to more particularly point out the present invention for the Examiner, and not for distinguishing over the prior art or the statutory requirements directed to patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Claims 1-20 are all of the claims pending in the present Application. New claims 6-20 are added above. Claims 1-5 stand rejected under 35 USC §101 as being directed to non-statutory subject matter. Claims 1-5 also stand rejected under 35 USC §103(a) as unpatentable over US Patent 5,970,464 to Apte et al., further in view of US Patent 5,692,107 to Simoudis et al.

These rejections are respectfully traversed in view of the following discussion.

### **I. THE CLAIMED INVENTION**

As described and claimed (e.g., by independent claim 1), the present invention is directed to a program storage device readable by a machine for constructing segmentation-based models that satisfy constraints on the statistical properties of the segments, including presenting a collection of training data records comprising examples of input values that are available to the model together with the corresponding desired output value(s) that the model is intended to predict generating on the basis of the training data a plurality of segment models, that together comprise an overall model, wherein each segment model is associated with a specific segment of the training data.

The generating includes performing an optimization that includes generating alternate training data segments and associated segment models, evaluating at least one generated segment to determine whether it satisfies at least one statistical constraint, and selecting a final plurality of segment models and associated segments from among the alternates evaluated that have satisfactory evaluations.

An advantage of the present invention is that it provides a technique analogous to the distinction between closed-loop and open-loop systems. That is, as discussed beginning on page 33, beginning at line 14, relative to techniques discussed in the specification, the present invention applies statistical constraints as segment splits are being constructed, thereby guiding the segment construction process.

## II. THE REJECTION UNDER 35 USC § 101 (STATUTORY SUBJECT MATTER)

The Examiner considers that the invention defined by claims 1-5 fails to pass a new two-prong test for statutory subject matter. As best understood by Applicant, the Examiner concedes that these five claims define an invention that passes the test articulated by the Federal Circuit Court of Appeals in *State Street Bank and Trust Co. v. Signature Financial Group Inc.*, and in *AT&T Corp. v. Excel Communications Inc.* That is, in the final paragraph of page 3 of the Office Action, the Examiner states that these claims recite a process that “produces a useful, concrete, and tangible result”. The Federal Circuit relied upon this wording from *Alappat*, which in turn relied upon the US Supreme Court ruling in *Diehr*.

The Examiner, however, alleges that a two-prong test actually applies, and that this second prong is “whether the invention is within the technological arts”. As best understood, the Examiner alleges that these five claims fail this prong of the test because they “only recite abstract ideas”. The Examiner, in effect, resurrects the “mental steps doctrine” in which the Examiner interprets the claims as including steps that “can be performed in the mind of the user or by use of a pencil and paper.”

It is noted that the “mental steps doctrine” is generally considered to have been laid to rest by *In re Prater* (415 F.2d 1378, 159 USPQ 583 (CCPA 1968) *on rehearing* 415 F.2d 1398, 162 USPQ 541 (CCPA 1969)). In *Prater*, the Court of Customs and Patent Appeals first ruled that the mental steps doctrine does not apply at all to claims that are confined to machine implementation of a process, even though the process can be alternatively carried out mentally (see *In re Mahoney*, 421 F.2d 742, 164 USPQ 572 (CCPA 1970); *In re Bernhart*, 417 F.2d 1395, 163 USPQ 611 (CCPA 1969)). Then the court ruled that any “sequence of operational steps” can constitute a “process” so long as it is part of the

“technological arts” (see *In re Musgrave*, 431 F.2d 882, 893, 167 USPQ 280, 289-90 (CCPA 1970)).

Applicant respectfully submits that there are at least two problems with the analysis currently on record. First, the rejection incorrectly adds a new, undefined prong to the holdings in *AT&T*. In this case, similar to claims 1-5 of the present invention, the Court of Appeals for the Federal Circuit likewise dealt with a method claim that could be interpreted as steps that clearly “can be performed in the mind of the user or by use of a pencil and paper”.

The claim at dispute in *AT&T* reads as follows:

“A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of:

generating a message record for an interexchange call between an originating subscriber and a terminating subscriber, and

including, in said message record, a primary interexchange carrier (PIC) indicator having a value which is a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers.”

There can be no doubt that these two steps in the above *AT&T* claim could “be performed in the mind of the user or by use of a pencil and paper”. Yet, the Federal Circuit Court of Appeals did not include a two-prong test that the Examiner now invokes.

Therefore, Applicant respectfully submits that the rejection of record errs as a matter of law in invoking a new, two-prong test for claims 1-5 of the present invention, when the these claims are somewhat similar in structure to that of *AT&T*. The Federal Circuit Court of Appeals has not even suggested that a second prong should be included to address the Examiner’s allegation that the claims “only recite abstract ideas”.

Second, Applicant respectfully submits that the rejection of record errs as a matter of fact because it clearly fails to heed the plain language of the claims. That is, the rejection takes the wording of the claims outside the context of the claim and, therefore, clearly contradicts the plain language of the claim.

Although it may be true that one could execute the steps included in the claims, these steps are not being claimed in isolation as an abstract idea. Therefore, the Examiner's interpretation is not even possible.

That is, claim 1 clearly does not state a process as being done mentally or manually on paper by someone using a pencil. Instead, claim 1 clearly states:

“A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for constructing segmentation-based models that satisfy constraints on the statistical properties of the segments, the method comprising:

(1) presenting a collection of training data records comprising examples of input values that are available to the model together with the corresponding desired output value(s) that the model is intended to predict; and

(2) generating on the basis of the training data a plurality of segment models, that together comprise an overall model, wherein each segment model is associated with a specific segment of the training data, said generating comprising performing optimization comprising:

- a) generating alternate training data segments and associated segment models;
- b) evaluating at least one generated segment to determine whether it satisfies at least one statistical constraint; and
- c) selecting a final plurality of segment models and associated segments from among the alternates evaluated that satisfy said statistical constraints.”

In order to interpret the above recited steps as being “performed in the mind of the user or by use of a pencil and paper”, one would have interpret that the machine interacts in some manner with the user so the user then actually performs the step(s) in the user's mind or interacts with someone (presumably the user) so that the user performs the step(s) by use of a pencil an paper.

No such machine/user interaction is described either in the claim language nor anywhere in the specification. In claim 1, the machine is claimed as executing these steps. The Examiner cannot simply choose to ignore the plain language of the claim itself. Moreover, new claim 14 clearly defines the process as being automatically executed by the computer. As pointed out at lines 23-24 of page 2 of the specification, the human effort in conventional methods is often quite high and a good risk model can take several years to develop and refine.

For at least the two above reasons, Applicant requests that the Examiner reconsider and withdraw the rejection based on 35 USC §101.

### III. PRIOR ART REJECTION

The Examiner alleges that US Patent 5,970,464 to Apte et al. teaches the present invention, but concedes that the primary reference “fails to expressly disclose ‘a program storage device readable by a machine tangibly embodying a program of instructions’ in the preamble.”

To overcome this deficiency, the Examiner then introduces US Patent 5,692,107 to Simoudis et al. The Examiner further asserts that one of ordinary skill in the art would have been motivated “to expand Apte’s computer-implemented method of underwriting profitability analysis to include this limitation, as taught by Simoudis, with the motivation of providing means for storage and retrieval of program data and instruction to be used at a later time”.

Applicant respectfully disagrees that one of ordinary skill in the art would agree with the Examiner that Apte can reasonably be considered as teaching the concepts of the present invention.

First, it is noted that the Examiner attempts to use the “mental steps doctrine” as both a sword and a shield. That is, the Examiner attempts to reject the invention defined in claims 1-5 as being an abstract idea by interpreting the claim language as reading upon a process that “can be performed in the mind of the user or by use of a pencil and paper”, thereby allowing the claims to be rejected under 35 USC §101.

The Examiner then relies on the description at lines 28-40 of column 4 of Apte for the prior art rejection.

As Applicant keeps stating on the record, line 28 of Apte clearly states that the operator is involved in the process described in these lines. That is, the operator’s mental steps are required in order to fulfill that “the end user can now examine each of these segments and their estimated pure premiums.... The user of the solution can now begin interactively experimenting with fine tuning the eligibility criteria for the product, until the segments that are dragging the overall loss down are satisfactorily removed.”

In contrast, as Applicant keeps stating on the record and as pointed out above for the response on the 35 USC §101 rejection, in the present invention, the computer itself

automatically performs the task of selecting and deciding on the segments. In the present invention as defined by the claims, no operator interaction is needed to execute the steps of the claims.

As Applicant keeps stating on the record, the technique described by the claimed invention provides a closed loop approach, as explained briefly in lines 20-25 of page 33, by applying statistical constraints as an integral part of automatically generating new segments. Neither this closed loop approach nor the use of a statistical constraint is suggested in Apte.

Second, Applicant respectfully submits that the Examiner incorrectly attempts to interpret "actual pure premium" as a "statistical constraint".

The only occurrence of the phrase "actual pure premium" in Apte is in the paragraph beginning at col. 3, line 60, which reads as follows:

*"The data mining engine extracts from the data a set of rules that utilize the most appropriate subset of the remaining fields in the data (known as the "explanatory" variables) in its antecedent. The consequence of such rules will typically be a prediction of a pure premium for the data points that satisfy the antecedent. The prediction will be probabilistic, i.e., associated with the prediction, in addition to the actual pure premium, will be estimates of the accuracy and confidence in the accuracy. An example of a rule extracted by the data mining process might be "If 'male driver' and 'age less than 25' and 'car type is 2-door sports sedan', Then 'estimated quarterly pure premium=\$700' with 'error estimate=0.2' and 'confidence interval=0.008'." Note that the rule set extracted by the data mining run will potentially have many such rules, perhaps in the hundreds."*

Based on the entire paragraph quoted above, Apte clearly intends the meaning of "actual pure premium" (e.g., "estimated quarterly pure premium=\$700") to be distinct and different from the meaning of "estimates of the accuracy" (e.g., "error estimate=0.2") and the meaning of "confidence in the accuracy" (e.g., "confidence interval=0.008").

It is also clear that "error estimate" and "estimates of the accuracy" in Apte corresponds to "statistical estimation error" and "accuracy of the estimated risk parameters" in the present patent application. This correspondence can be clearly seen by comparing the exemplary rule presented by Apte in the paragraph quoted above to the definition of actuarial credibility as summarized on page 49, lines 18-27 of the present application:

*"Actuarial credibility (see, for example, Klugman et al. above) has to do with the*

*accuracy of the estimated risk parameters---in this case, frequency, severity, and ultimately pure premium. Accuracy is measured in terms of statistical confidence intervals; that is, how far can the estimated risk parameters deviate from their true values and with what probability. A fully credible estimate is an estimate that has a sufficiently small confidence interval. In particular, estimated parameter values  $X$  must be within a certain fraction  $r$  of their true (i.e., expected) values  $E[X]$  with probability at least  $p$ : [equation omitted]. Typical choices of  $r$  and  $p$  used by actuaries are  $r = 0.05$   $p = 0.9$ . In other words,  $X$  must be within 5% of  $E[X]$  with 90% confidence."*

Clearly, "actual pure premium" in Apte (e.g., "estimated quarterly pure premium") corresponds to the "estimated parameter value  $X$ " in the definition of actuarial credibility quoted above. Likewise, "estimate of the accuracy" in Apte (e.g., "error estimate") corresponds to the fractional error " $r$ " in the definition of actuarial credibility, and "confidence in the accuracy" in Apte (e.g., "confidence interval") corresponds to the probability " $p$ " that the true value of parameter " $X$ " is within the specified fractional error " $r$ " of the estimated value of parameter " $X$ ".

Turning now to the meaning of "statistical constraint" in the present application, it should be clear that its meaning is directly related to error estimates, as is evident from the paragraph beginning on page 2, line 28 of the application:

*"Our method of the present invention overcomes the limitations inherent in manual methods for constructing segmentation-based predictive models by combining automated search over possible segmentations with constraints on the statistical estimation errors that can be tolerated in the predictive models that are constructed for each segment. In the case of insurance risk modeling, the segments would correspond to risk groups and the constraints would correspond to criteria used by actuaries to assess actuarial credibility."*

as well as from the paragraph beginning on page 7, line 4 of the application:

*"In sharp contrast, our segmentation-based modeling method is able to utilize complex constraints, such as actuarial credibility, as an integral part of the model building process so as to produce segmentations that satisfy the constraints. In particular, when applied to insurance risk modeling, our method ensures that the resulting risk groups will meet desired actuarial credibility constraints."*

Because Apte clearly intends the meaning of "actual pure premium" to be distinct and different from the meaning of "estimates of the accuracy" (e.g., "error estimate"), and because the meaning of "statistical constraint" in the present application has to do with error estimates, the interpretation of "actual pure premium" as a "statistical constraint" is completely untenable because the two phrases relate to two entirely different things. In particular, equating "actual pure premium" with "statistical constraint" would require equating "actual pure premium" with "error estimate," which would be inconsistent with Apte et al., as well as with all of actuarial science.

Hence, turning to the clear language of the claims, there is no teaching or suggestion in the Apte reference of "... generating alternate training data segments and associated segment models; evaluating at least one generated segment to determine whether it satisfies at least one statistical constraint ...", as required by claim 1. Similar language is in claims 2-4. Simoudis does nothing to make up for this deficiency.

Accordingly, for this reason alone, claims 1-5 are fully patentable over the Apte reference.

Further, the other prior art of record has been reviewed, but it too, even in combination with the Apte or Simoudis, fails to teach or suggest the claimed invention.

#### **IV. FORMAL MATTERS AND CONCLUSION**

In view of the foregoing, Applicant submits that claims 1-20, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

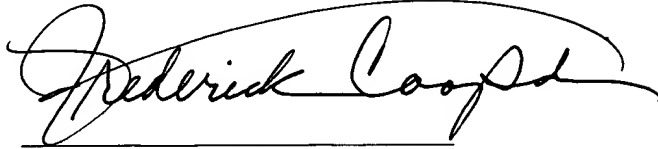


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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

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Respectfully Submitted,



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